INSTRUCTION AND MAINTENANCE MANUAL

ITHACO MODEL 331

ITHACO

MODEL 331

INSTRUCTION AND MAINTENANCE MANUAL

CONTENTS

Introduction

Specification

Operating Instructions

Theory of Operation

Calibration

Warranty

Parts Lists

Drawings

Item	Elem. Diagrams	Assembly
Normalizer Card	C30082	C30081
Power Isolator	B20373	B20374
Frame	D40041	

Serial Number _____

INTRODUCTION

Model 331 Signal Normalizer provides signal normalization for six signal c channels. In addition power is supplied for a variety of ITHACO transducer preamplifiers.

When used with an ITHACO Model 125, transducer sensitivity in mv/g is set on the front panel. The output is then normalized to 10 mv/g.

An ITHACO Model 139 preamplifier converts pC/g to mv/g directly. Thus the use of Model 139 provides the advantages of a charge preamplifier with signal normalization.

An ITHACO Model 145 Velocity Preamplifier provides the ability to dial transducer sensitivity and obtain normalized output signal representing velocity.

COMBINED SPECIFICATIONS, MODEL 331 WITH PREAMPLIFIERS

Preamplifier Type Used	Model 125 Unity Gain Preamplifier	Model 139 Charge Preamplifier	Model 145 Velocity Preamplifier
Normalized Output	Acceleration	Acceleration	Velocity
Normalized Sensitivity	10 mv/g	10 mv/g	50-200 mv/ips*
Frequency Response (3 db points)	.5 cps-100KC	.5 cps-100KC	3 cps-10KC
Midband Accuracy	1%	1%	1%
Accelerometer Sensitivity Range	1-100 mv/g	1-100 pc/g	1-100 mv/g
Preamplifier Input Impedance	1000 meg 10 pf	----------	1000 meg 10pf
Max Output Noise			
X1 sensitivity multiplier	100 μv rms	100 μv rms	100 mv peak
X10 sensitivity multiplier	20 μv rms	20 μv rms	10 mv peak
Max output signal	5 volts pk	5 volts pk	5 volts pk
Max Preamplifier Input Signal	5 volts pk		
Mechanical	5 1/4" x 19" panel for relay rack mounting		
Power Required	115 ±10 volts at 60 cps		
Input Connectors (on rear)	Six XLR 4-31 accept output from and provide power for preamplifiers		
Output Connectors (on rear)	Six BNC type connectors One MS 3102A-22-14S connector with six auxiliary outputs and grounds		
Control			
Each Channel	Helipot and range switch covers accelerometers with sensitivity of 1 to 100 millivolts/g with Model 125 or 145 preamplifier, or 1 to 100 picocoulomb/g with Model 139 preamplifier		
Common	On/off switch and pilot light		

*Locking control is set to user standards, independent of accelerometer sensitivity.

APPLICATIONS

. Model 125 Unity Gain Voltage Preamplifier is recommended for applications where accelerometers are calibrated with cables, or where cable loading is negligible. These units feature 1000 megohm input impedance, small size, and relatively low cost.

. Model 139 Charge Preamplifiers are for use where it is necessary to eliminate effects of cable loading on the transducer. The multi-turn control on the Model 331 Signal Normalizer is set for accelerometer charge sensitivity in picocoulombs per g.

. Model 145 Velocity Preamplifier provides an output proportional to velocity. The sensitivity control on the preamplifier is permanently adjusted to user standards in the range 50-200 mv/ips when accelerometer sensitivity is set with the multi-turn control on the Model 331 panel.

OPERATING INSTRUCTIONS

The Model 331 Signal Normalizer has a relatively low input impedance and is intended for use only with ITHACO preamplifiers.

The input connectors are XLR types and are located on the rear of the unit. Power is supplied to the preamplifier through this connector. The output connectors are standard BNC.

To operate the Model 331, an input signal should be supplied from a transducer, or other source, through the desired ITHACO preamplifier. Power is controlled by the front panel switch. Except for setting transducer sensitivity, no other control operation is necessary.

In certain cases, 60 cps may be picked up because of external grounding used. See the theory of operation for a discussion of this problem.

THEORY OF OPERATION

The individual channel schematic is shown on C30082. The input signal drives an emitter follower, Q1, which in turn drives the 10 turn potentiometer. The output drives a high input impedance amplifier whose gain is either 1 or 10.

The amplifier has two inverting stages, Q3 and Q5. Feedback is provided to the source of Q3 to provide stable gain. The dc operating point is determined by feedback to the gate of Q2. The output is taken from an emitter follower.

The complete wiring diagram is shown in D40041. All signal grounds are isolated from the frame. Furthermore all channel signal grounds are isolated from each other except at TB1. Since a common DC power supply is used, a common must exist at some point. If the Model 331 outputs are used remotely, it may be desirable to separate the channels in the Model 331 by removing the shorting bars on TB1. The ground side of the power supply must be picked up at K on J7 and run to the point at which the signal grounds become common or the point at which the output is used.

All preamplifiers are sealed and require no maintenance. Additional filtering is supplied for the preamplifiers through the use of an isolator card mounted in the main frame. The schematic is shown on B20373 and consists of a simple two transistor capacitor multiplier. It is protected by F2 (125 ma) located at the rear of the main frame.

Also located on the rear is the line fuse rated at 1.5 A.

CALIBRATION

Model 331 may be calibrated with or without preamplifiers. For simplicity, it is easier to calibrate without the preamplifiers. Insert a signal between pins 1 and 3 (signal gnd) on the XLR. Care should be taken not to short pin 4 which is power for the preamplifiers.

With the front panel switch in the 10-100 position and the multiplier at 1.00, unity gain should be observed between input and output. For multiplier settings greater than 1.00, the gain should be the reciprocal of the setting. Gain accuracy should be ±1%.

With the front panel switch in the 1-10 position and the multiplier set to 1.00, a gain of 10 should be observed. Should this gain be in error, R16 on the card may be adjusted. This is the only internal adjustment provided.

WARRANTY

ITHACO, Inc. warrants each instrument to be free of defects in material and workmanship for a period of one year after shipment to the original purchaser; vacuum tubes, semiconductors, and batteries are specifically excluded. Liability under this warranty is limited to repairing or adjusting any instrument returned to the factory for that purpose. The warranty for this instrument is void if the instrument has been modified other than in accordance with written instructions from ITHACO, or if defect or failure is judged by ITHACO to be caused by abnormal conditions of operation, storage, or transportation.

This warranty is subject to verification by ITHACO, that a defect or failure exists, and to compliance by the original purchaser with the following instructions:

1. Before returning the instrument, notify ITHACO with full details of the problem; include model number and serial number of the instrument involved.

2. After receiving the above information, ITHACO will give you shipping instructions or service instructions. After receipt of shipping instructions, ship the instrument to ITHACO. Full liability for damage during shipment is borne by the purchaser. It is recommended that instruments shipped to us be fully insured and packed surrounded by at least two inches of shock-absorbing material.

ITHACO reserves the right to make changes in design at any time without incurring any obligation to install same on units previously purchased.

This warranty is expressly in lieu of all other obligations or liabilities on the part of ITHACO, and ITHACO neither assumes, nor authorizes any other person to assume for it, any liability in connection with the sales of ITHACO instruments.

2/26/65

ITHACO, INC. ITHACA, N. Y.

REV. NO.

PARTS LIST FOR C200A1

CONT. ON SHEET 2 SH. NO. 1

TITLE A[illegible] P.C. CARD [illegible]

FIRST MADE FOR 2012-66

ITEM	IDENTIFICATION NUMBER	DESCRIPTION OR NAME	GROUP NO. & QUANTITY
C1	GE #62F403	CAPACITOR	1
C2	# AEROVOX MC50V68OAM	68 PF	1
C3	GE #64F10AA152		1
C4	GE #62F404		1
C5	GE #62F104	5 UF 30V	1
C6	AEROVOX # MC50V103AM	.01 UF	1
	AEROVOX # MC50V101AM	100 PF	1
C8	AEROVOX # MC50V101AM	100 PF	1
	[illegible] #62F403	[illegible]	[illegible]
C9	[illegible]	[illegible]	[illegible]
C10	[illegible] 7	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]
C11	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]

ITHACO, INC. ITHACA, N. Y.

REV. NO

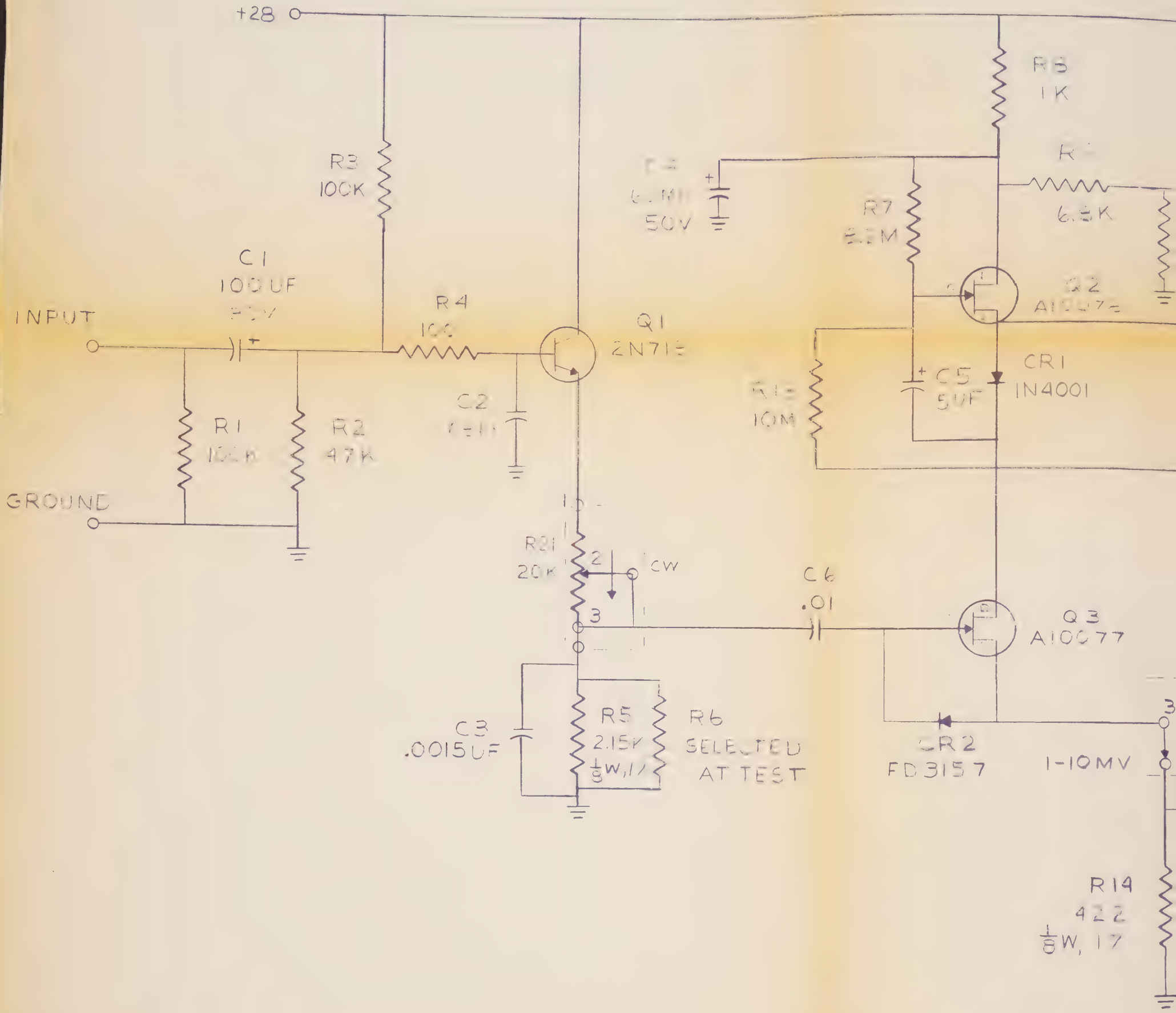
PARTS LIST FOR C300F

CONT. ON SHEET F SH. NO. 2

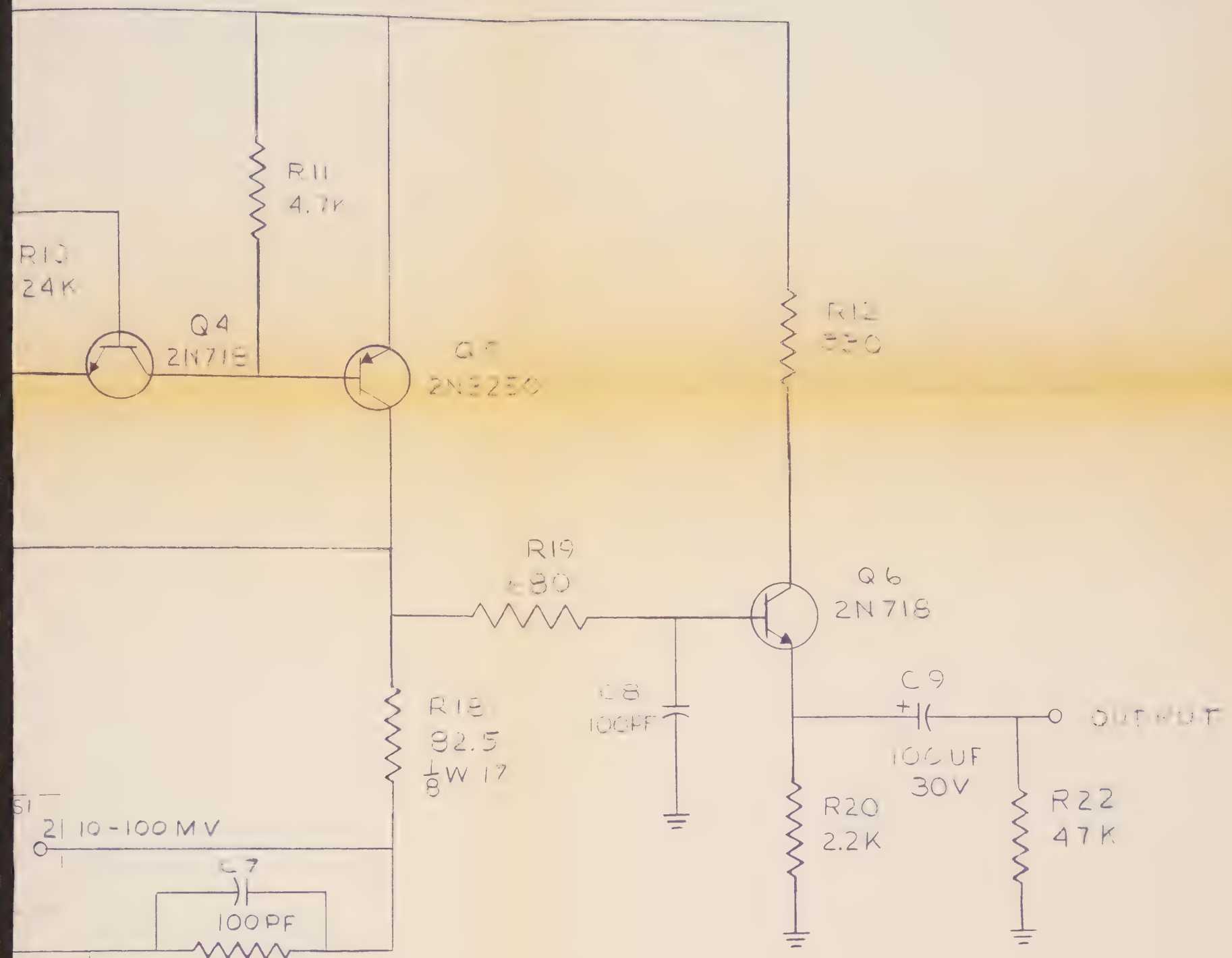
TITLE ASSY P.C. CARD, NORMALIZER

FIRST MADE FOR 5012-6

ITEM	IDENTIFICATION NUMBER	DESCRIPTION OR NAME	GROUP NO. & QUANTITY
	RC07GF825J	RESISTOR	


+28
R3
100K
C1
100 UF
INPUT
R4
100
Q1
2N718
C2
R1
100K
R2
47K
GROUND
R21
20K
CW
C3
.0015UF
R5
2.15K
1/8W, 1%
R6
SELECTED
AT TEST
C6
.01
R8
1K
R7
6.8M
6.8K
Q2
A10077
CR1
IN4001
R10
10M
C5
5UF
Q3
A10077
CR2
FD3157
1-10MV
R14
422
1/8W, 1%

REVISIONS			C 30082
		CONT. ON SH.	SH. NO.
SYM.	DESCRIPTION	DATE	APPROVAL
A	NOTE * 1 WAS 1/2W [illegible]	[illegible]	[illegible]



NOTES: UNLESS OTHERWISE SPECIFIED:
1- RESISTANCE IN OHMS 1/4W, TOL ± 5%

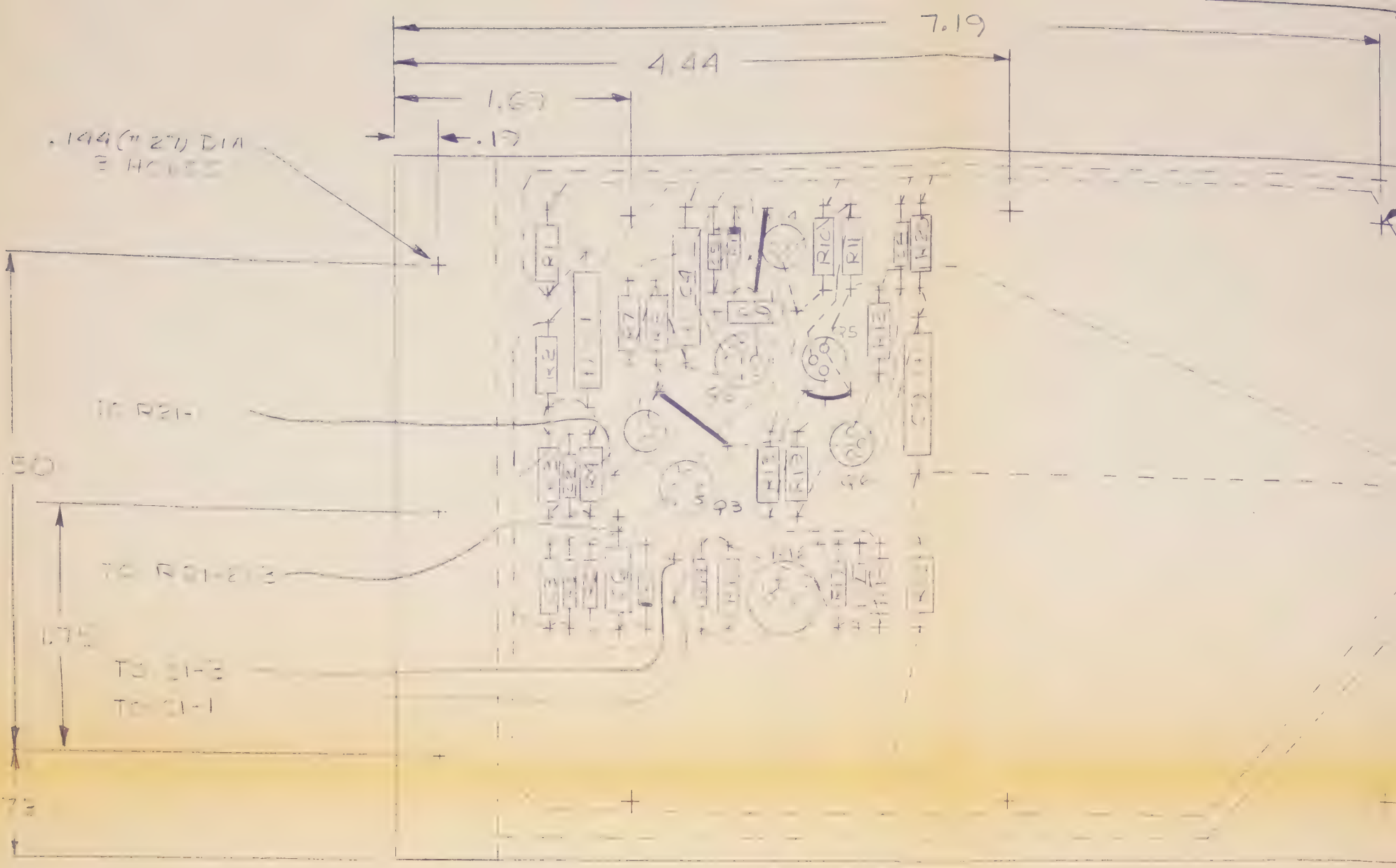
RA
RG

ELEM DIAG
P.C. BOARD NORMALIZER
FMF 5012-68
DRAWN BY [illegible] 12 [illegible]
APPROVAL: DFTG. [illegible] ENG [illegible]
ISSUE DATE [illegible]

ITHACO, INC.
ITHACA, N.Y.

C 30082
CONT. ON SH. SH. NO.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±


7.19
4.44
1.67
.17
.149 (#27) DIA
3 HOLES
3.50
TO R21-1
TO R21-2
TO J1-3
TO J1-1
1.75
.72
C54
C55
C56
C57
C58
C59
C60
C61
C62
C63
C64
C65
C66
C67
C68
C69
C70
C71
C72
C73
C74
C75
C76
C77
C78
C79
C80
C81
C82
C83
C84
C85
C86
C87
C88
C89
C90
C91
C92
C93

REVISIONS		C 30081	
		CONT ON SH.	SH. NO.
SYM.	DESCRIPTION	DATE	APPROVAL
A	BOARD WAS 5.03". ADDED CHAMFER NOTE AUGUST 16, 1965 JB	8/17/65	
B	ADDED NOTCH. QTY HOLES PT 2 WERE: 'A'-21, 'C'-24 'NO LABEL'-41.	9/28/65	

DRILL TABLE

LTR	DESCRIPTION	QTY	FAL DIA
A	.035 (#72) DIA	18	.006 C
B	.032 (1/32) DIA	8	.00[illegible]
C	.025 (#76) DIA	[illegible]	.00[illegible]
NO LABEL	.040 (#60) DIA	34	.00[illegible]

SEE SEPARATE PARTS LIST

P.C. BOARD NORMALIZER

FMF-5012 68

DRAWN BY [illegible] July 27, 1965

APPROVAL: DFTG. [illegible] ENG. [illegible]

ISSUE DATE August [illegible] 1965

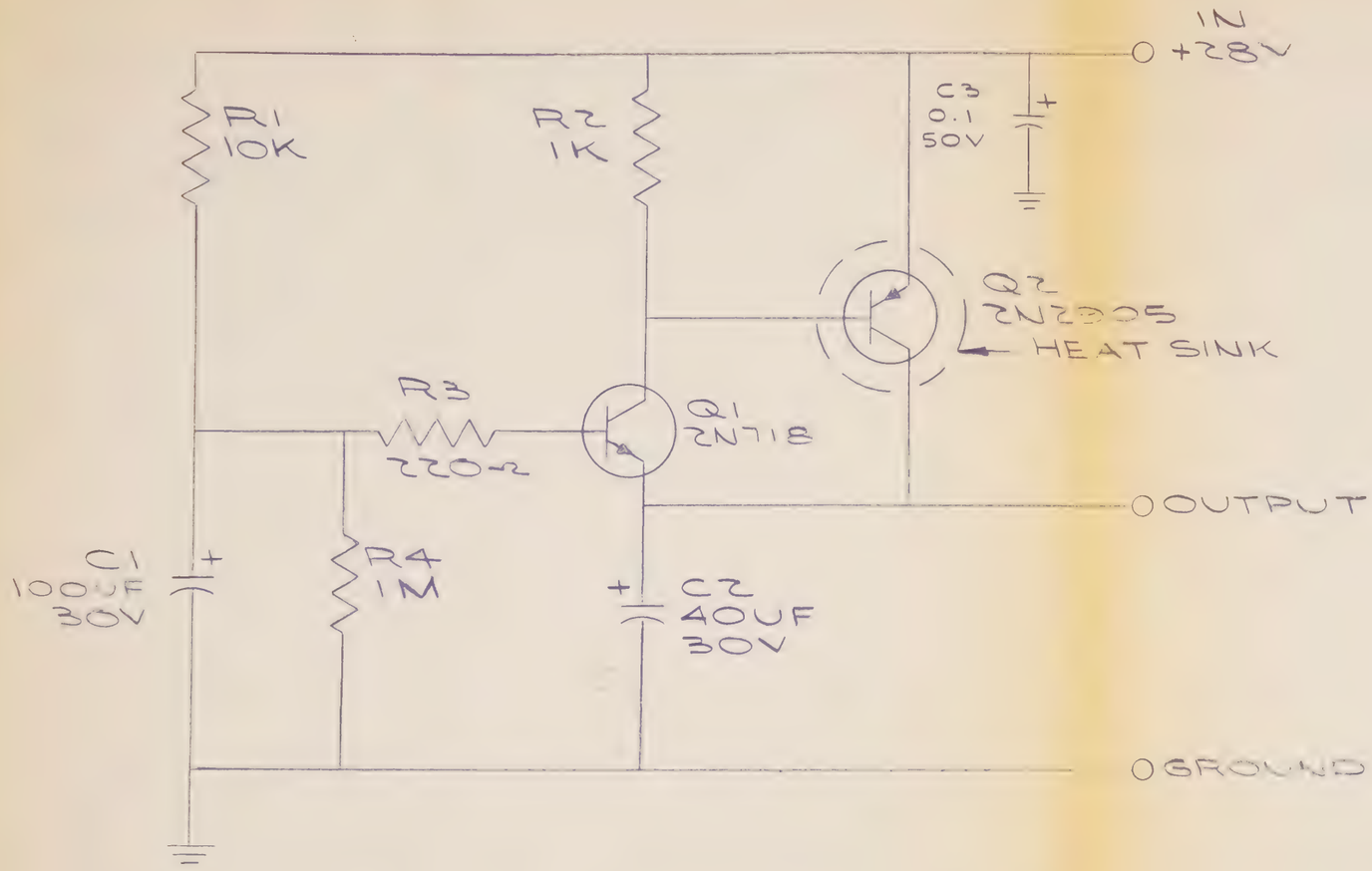
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± XX ± .C[illegible] ±
XXX .C[illegible]

ITHACO, INC.
ITHACA, N.Y.

C 30081

CONT. ON SH. SH. NO.

REVISIONS			B 20373
		CONT. ON SH	SH NO
SYM.	DESCRIPTION	DATE	APPROVAL
A	R1 WAS 100K DMW 4-21-66	4/29/66	



NOTES-

1. ALL RESISTORS 1/2W, 5% EXCEPT AS NOTED.
2. C1, C2, & C3 ARE G.E. 62F SERIES.
3. Q2 HEAT SINK IS THERMALLOY #1101A.

RG

ELEM DIAG

ISOLATOR

FMF 5012-68 (MOD 331)

DRAWN BY D. L. Fuller, Sept. 22, 1965

APPROVAL: DFTG. ENG.

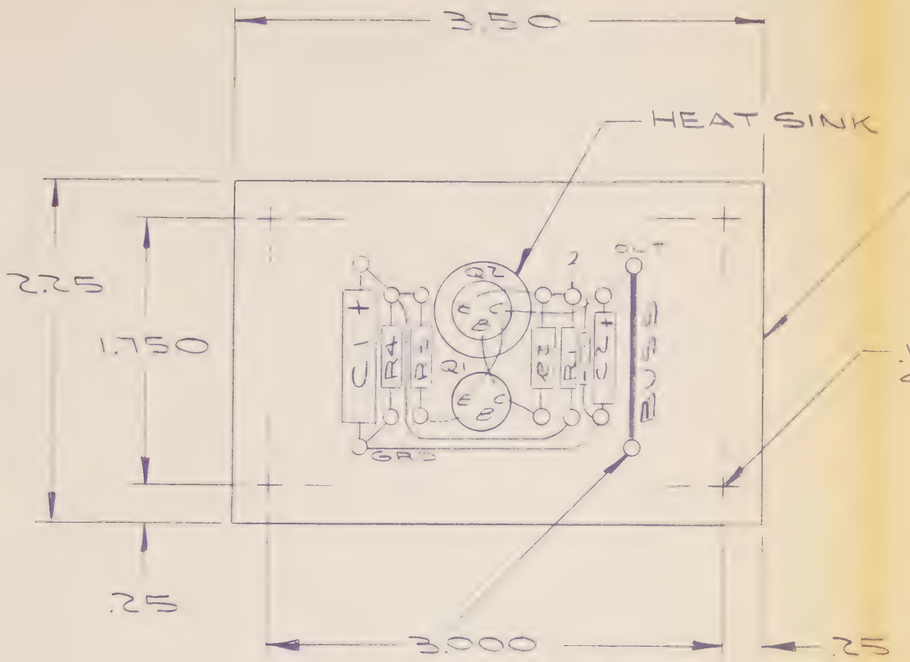
ISSUE DATE September 23, 1965

ITHACO, INC.
ITHACA, N.Y.

B 20373

CONT. ON SH. SH. NO

REVISIONS			B 20374
		CONT ON SH	SH NO
SYM.	DESCRIPTION	DATE	APPROVAL



(2) MATL
GLASS EPOXY G10
.06 THK

.169 (#18)
4 HOLES

(3) (CTC #1785-2, QTY 14)

(1) ASM
FOR ELEM DIAG
SEE B 20373

WIRING FARSIDE OF CARD

RA
RG

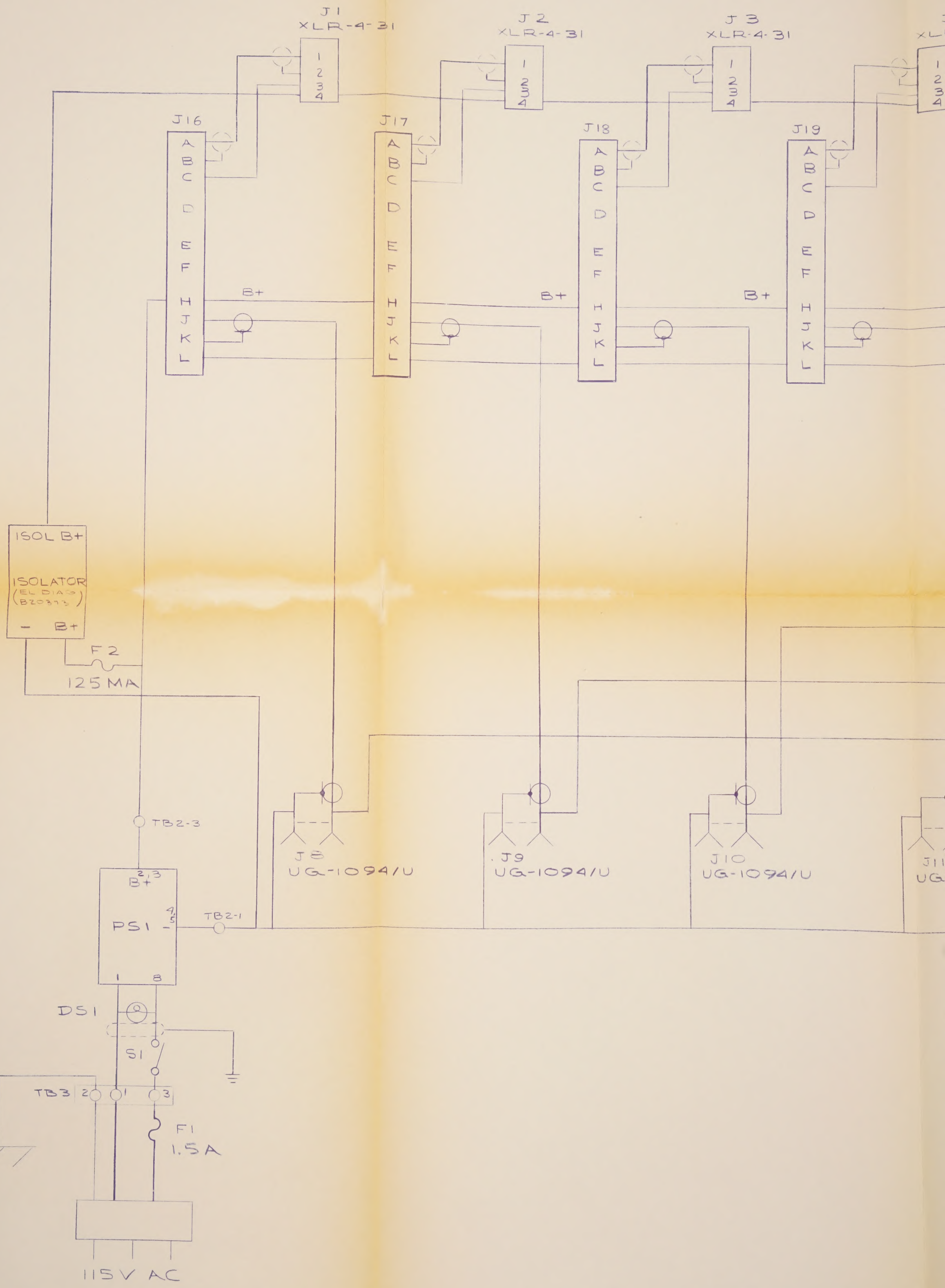
CFO D40028

ASM
ISOLATOR

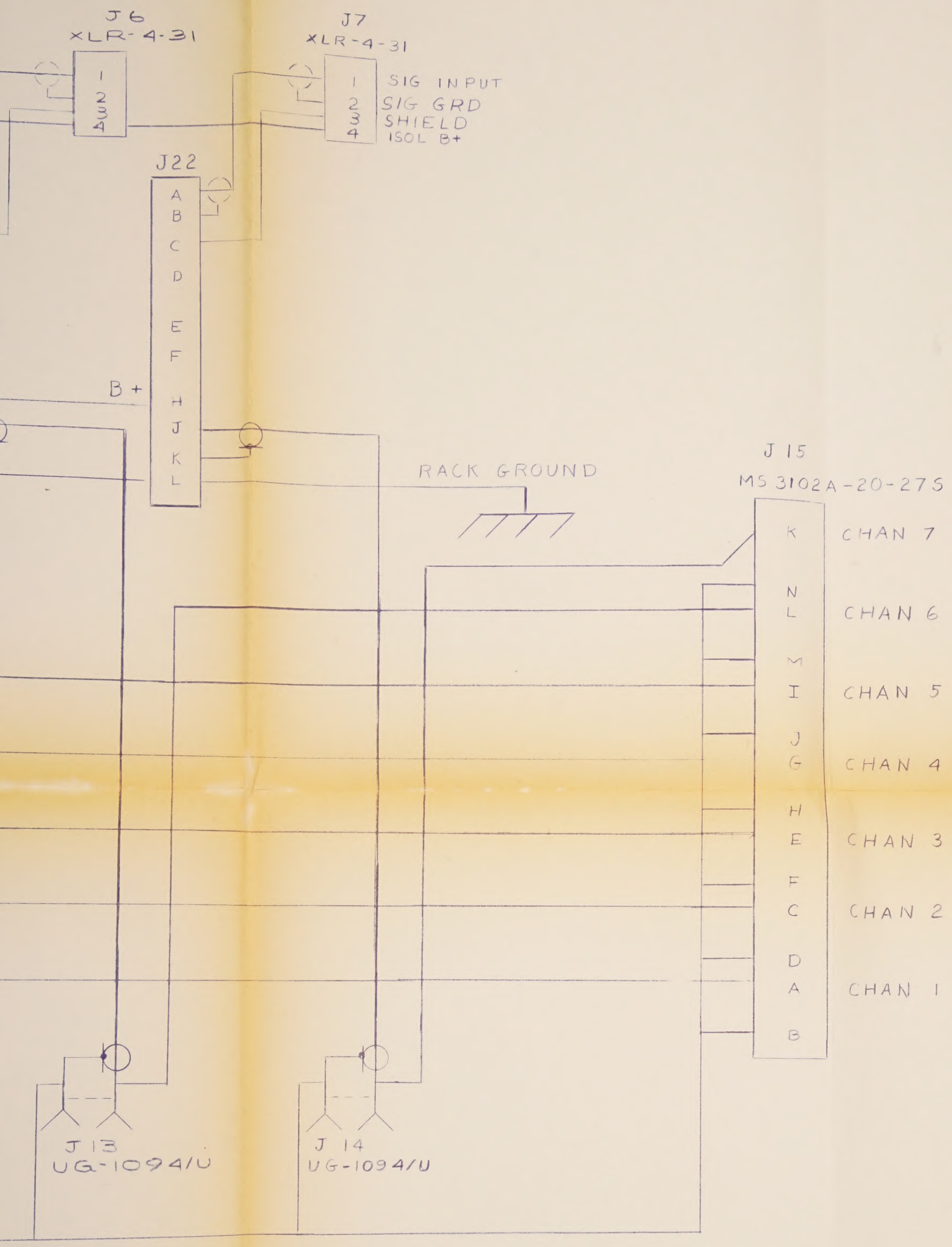
FMF 5012-68 (MOD 331)
DRAWN BY D.L. Fuller, Sept. 22, 1965
APPROVAL: DFTG. [illegible] ENG. [illegible]
ISSUE DATE Sept. Tuesday 23, 1965

ITHACO, INC.
ITHACA, N.Y.

B 20374
CONT ON SH. SH. NO


J1
XLR-4-31
J2
XLR-4-31
J3
XLR-4-31
J16
J17
J18
J19
A
B
C
D
E
F
H
J
K
L
1
2
3
4
B+
ISOL B+
ISOLATOR
(EL DIAO)
(BZ0313)
- B+
F2
125 MA
TB2-3
B+ 2,3
PS1 - 4,5
TB2-1
1 8
DS1
S1
TB3 2 1 3
F1
1.5 A
115 V AC
J8
UG-1094/U
J9
UG-1094/U
J10
UG-1094/U

B	REVERSED: SIG GRD & SHIELD C9-4 6-66	[illegible]	[illegible]
C	REROUTED WIRING FOR J15 & ISOL B+ DMW 4-27-66	4-27-66	DMW



NOTES:
FOR 6 CHANNEL RACK
DELETE J7, J14 & J22

RG

WIRING DIAG
RACK, NORMALIZER
FMF 5012-68 (MOD 33)
DRAWN BY GW Krauss Aug 13, 1965
APPROVAL: DFTG. ENG.
ISSUE DATE August 20, 1965

ITHACO, INC.
ITHACA, N.Y.

D 40041

CONT. ON SH. SH. NO.

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